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Patent Application
Attorney Docket No. D/A1503

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND
INTERFERENCES

Inventor(s): Thomas W. Smith et al.

Application No.: 10/036,590

Filed: November 7, 2001

Examiner: C. Shosho

Art Unit: 1714

Confirmation No.: 4094

Title: INK COMPOSITIONS WITH IMPROVED
LIGHTFASTNESS

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

LETTER

Enclosed herewith is an original and two copies of Appellants' Brief on Appeal in the above-identified application.

Please charge any fees associated with the filing of the Brief on Appeal to Xerox Corporation, Deposit Account No. 24-0025. Two duplicate copies of this letter are enclosed.

Respectfully submitted,

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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Thomas W. Smith et al.

Application No.: 10/036,590

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For: INK COMPOSITIONS WITH IMPROVED LIGHTFASTNESS

BRIEF ON APPEAL

Appeal from Group Art Unit 1714

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I. **REAL PARTY IN INTEREST:**

The real party in interest for this appeal and the present application is Xerox Corporation, by way of an Assignment recorded in the U.S. Patent and Trademark Office at Reel 12445, Frame 567-568.



II. **STATEMENT OF RELATED APPEALS AND INTERFERENCES:**

There are no prior or pending appeals, interferences or judicial proceedings, known to Appellants, Appellants' representative, or the Assignee, that may be related to, or which will directly affect or be directly affected by or have a bearing upon the Board's decision in the pending appeal.

III. STATUS OF CLAIMS:

Claims 1 to 8 and 10 to 25 are on appeal.

Claims 1 to 8 and 10 to 25 are pending.

Claims 1 to 8 and 10 to 25 are rejected.

Claim 9 is cancelled.

IV. **STATUS OF AMENDMENTS:**

No Amendment After Final Rejection has been filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER:

The invention of claim 1 is directed to an ink composition comprising (a) water (page 10, line 26 to page 11, line 24) and (b) a complex of (i) an anionic dye (page 22, line 19 to page 24, line 19), (ii) an anionic lightfastness-imparting agent which is an ultraviolet absorber (page 24, line 20 to page 32, line 6), a thiosulfate salt, a trithionate salt, a tetrathionate salt, or a mixture thereof (page 32, lines 7 to 16), and (iii) a polyquaternary amine compound (page 11, line 25 to page 22, line 18).

The invention of claim 12 is directed to an ink according to claim 1 wherein the number of cationic sites on the polyquaternary amine molecule for every one anionic site on the lightfastness-imparting agent molecule is at least about 1, and wherein the number of cationic sites on the polyquaternary amine molecule for every one anionic site on the lightfastness-imparting agent molecule is no more than about 5 (page 33, lines 3 to 10).

The invention of claim 13 is directed to an ink according to claim 1 wherein the molar ratio of dye molecules to lightfastness-imparting agent molecules is at least about 2:1, and wherein the molar ratio of dye molecules to lightfastness-imparting agent molecules is no more than about 20:1 (page 33, lines 10 to 16).

The invention of claim 16 is directed to a process which comprises (a) incorporating into an ink jet printing apparatus an ink composition comprising (a) water (page 10, line 26 to page 11, line 24) and (b) a complex of (i) an anionic dye (page 22, line 19 to page 24, line 19), (ii) an anionic lightfastness-imparting agent which is an ultraviolet absorber (page 24, line 20 to page 32, line 6), a thiosulfate salt, a trithionate salt, a tetrathionate salt, or a mixture thereof (page 32, lines 7 to 16), and (iii) a polyquaternary amine compound (page 11, line 25 to page 22, line 18), and

- (b) causing droplets of the ink composition to be ejected in an imagewise pattern onto a substrate (page 42, lines 3 to 6).

The invention of claim 20 is directed to a process which comprises (a) incorporating into an ink jet printing apparatus an ink composition comprising (a) water (page 10, line 26 to page 11, line 24) and (b) a complex of (i) an anionic dye (page 22, line 19 to page 24, line 19), (ii) an anionic lightfastness-imparting agent which is an ultraviolet absorber (page 24, line 20 to page 32, line 6), a thiosulfate salt, a trithionate salt, a tetrathionate salt, or a mixture thereof (page 32, lines 7 to 16), and (iii) a polyquaternary amine compound (page 11, line 25 to page 22, line 18), and (b) causing droplets of the ink composition to be ejected in an imagewise pattern onto a paper (page 42, lines 16 to 19) substrate (page 42, lines 3 to 6).

VI.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL:

The following grounds of rejection are presented for review:

1. Claims 1 to 8, 11 to 20, and 22 to 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Gundlach et al. (U.S. Patent 6,054,505) in view of Vieira et al. (U.S. Patent 5,686,633).

2. Claims 1 to 7, 11 to 20, and 22 to 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Gundlach et al. (U.S. Patent 6,054,505) in view of Yokoyama et al. (U.S. Patent 4,256,493).

3. Claims 1 to 4 and 10 to 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Gundlach et al. (U.S. Patent 6,054,505) in view of either Bergthaller et al. (U.S. Patent 5,855,657) or Ma et al. (U.S. Patent 6,432,523).

VII. ARGUMENT:

The present invention is directed to ink compositions comprising water and a complex of (i) an anionic dye, (ii) an anionic lightfastness-imparting agent which is an ultraviolet absorber, a thiosulfate salt, a trithionate salt, a tetrathionate salt, or a mixture thereof, and (iii) a polyquaternary amine compound. Advantages of the present invention include improved waterfastness, improved wet smear resistance, reduced intercolor bleed when two or more colors are printed adjacent to each other, bright colors, low cost, and high waterfastness obtained with acid dyes when complexed with cationic polymers, improved shelf stability, improved jetting characteristics, excellent smear resistance, heat stability, freeze/thaw stability, relatively low viscosity, the combination of these advantages with improved lightfastness, and other advantages as set forth in the instant specification and illustrated in the examples.

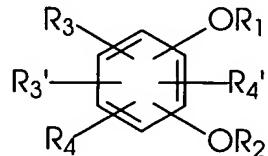
1. Claims 1 to 8, 11 to 20, and 22 to 25 are Patentable Under 35 U.S.C. §103(a) Over Gundlach et al. (U.S. Patent 6,054,505) in view of Vieira et al. (U.S. Patent 5,686,633).

The Examiner has rejected claims 1 to 8, 11 to 20, and 22 to 25 under 35 U.S.C. §103(a) as being unpatentable over Gundlach et al. (U.S. Patent 6,054,505) in view of Vieira et al. (U.S. Patent 5,686,633).

Gundlach et al. discloses an ink composition which comprises (1) water; (2) a nonpolymeric salt comprising at least one cation and at least one anion; and (3) a colorant comprising an anionic dye complexed with a polyquaternary amine compound. Also disclosed is an ink composition which comprises (1) water; (2) a nonpolymeric salt comprising at least one cation and at least one anion; (3) an anionic dye; and (4) a polyquaternary amine compound. In one embodiment, the polyquaternary amine compound is selected from the group consisting of polydiallyl ammonium compounds, polyquaternized polyvinylamines, polyquaternized polyallylamines, epichlorohydrin/amine copolymers, cationic amido amine copolymers, copolymers of vinyl pyrrolidinone and a vinyl imidazolium salt,

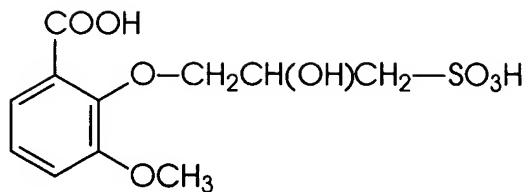
and mixtures thereof. The reference further discloses that other optional additives can be present in the inks, including pH controlling agents such as acids or bases, phosphate salts, carboxylate salts, sulfite salts, amine salts, and the like.

Vieira et al. discloses inks, particularly inks for ink jet printing, containing at least one compound of the formula

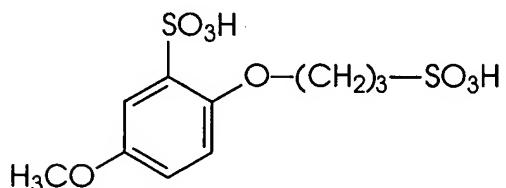


as a stabilizer. The symbols R₁, R₂, R₃, R₄, R_{3'}, and R_{4'} are as defined in claim 1. The compounds are in part novel and are suitable for use as light stabilizers for organic materials.

The Examiner has stated that Gundlach et al. discloses an ink comprising water, 0.1 to 40 percent nonpolymeric salt, 1 to 5 percent anionic dye, and a polyquaternary amine such as polydiallyl dimethyl ammonium, polyquaternized polyvinylamine, polyquaternized polyallylamine, epichlorohydrin/amine, cationic amido amine, and copolymers of vinyl pyrrolidone and vinyl imidazolium salt, that the reference discloses that the ink is preferably printed using a thermal ink jet printer but also discloses the use of other conventionally known ink jet printing methods such as acoustic ink jet printing and piezoelectric ink jet printing, that the difference between this reference and the present claimed invention is the requirement in the claims of (a) an anionic lightfastness-imparting agent, and (b) the number of cationic sites on the polyquaternary amine per one anionic site on the dye or the number of cationic sites on the polyquaternary amine per one anionic site on the lightfastness imparting agent, that with respect to difference (a), Vieira et al., which is drawn to ink jet inks, discloses the use of 0.01 to 30 percent anionic lightfastness imparting agent identical to that presently claimed such as 2,3-dimethoxybenzoic acid, 3,4,5-trimethoxybenzoic acid, 4,5-dimethoxyphthalic acid, 2,3-bis(carboxymethoxy)benzoic acid,



or



that the motivation for using these lightfastness imparting agents is to produce a stable ink that will not fade or discolor, that although there is no disclosure in either Gundlach et al. or Vieira et al. of complex of dye, polyquaternary amine, and lightfastness imparting agent as presently claimed, given that Gundlach et al. discloses that upon mixing the ink ingredients, the anionic dye and the polyquaternary amine compound form a complex and given that Gundlach et al. in view of Vieira et al. disclose anionic dye, polyquaternary amine, and lightfastness imparting agent identical to those presently claimed, these ingredients will intrinsically form a complex, that in light of the motivation for using lightfastness imparting agents disclosed by Vieira et al., it would have been obvious to one of ordinary skill in the art to use such lightfastness imparting agent in the ink of Gundlach et al. to produce a stable ink that will not fade or discolor and thereby arrive at the claimed invention, that with respect to difference (b), Gundlach et al. discloses that the number of cationic sites on the polyquaternary amine compound must be larger than the number of anionic sites on the dye to avoid the polymer from precipitating, but contains no explicit disclosure of the number of cationic sites on the polyquaternary amine per one anionic site on the dye or the number of cationic sites on the polyquaternary amine per one anionic site on the lightfastness imparting agent, and that given that Gundlach et al. discloses that the number of cationic groups should be larger than the number of anionic groups to avoid precipitation, it would have been

obvious to one of ordinary skill in the art to control the number of cationic sites on the polyquaternary amine per one anionic site on the dye or per one anionic site on the lightfastness imparting agent to values, including that presently claimed, to prevent precipitation and to produce an ink with excellent shelf stability and thereby arrive at the claimed invention. The Examiner is thus of the position that these references, viewed in combination, render obvious the present invention as recited in claims 1 to 8, 11 to 20, and 22 to 25.

Appellants disagree with this position. Gundlach et al. neither teaches nor suggests the use of lightfastness agents such as ultraviolet absorbers, thiosulfate salts, trithionate salts, or tetrathionate salts in the inks disclosed therein. Vieira et al. teaches simple addition of lightfastness agents of the given formula into inks, and neither teaches nor suggests that such agents could or should form complexes with other ink ingredients. Vieira et al. further fails to teach or suggests inks containing polyquaternary amines. One of ordinary skill in the art would not be motivated to view these particular references in combination and would not be led to make an ink wherein both an anionic dye and an anionic lightfastness-imparting agent are complexed to a polyquaternary amine. As stated in the present application:

it is believed that in the inks according to the present invention, the lightfastness-imparting agent and the anionic dye are both complexed to the polyquaternary amine compound, and are thus in close proximity to each other; accordingly, the lightfastness-imparting agent is always in a location wherein it can function most efficaciously in protecting the chromophore from degradation caused by short wave radiation such as ultraviolet radiation. This protection is particularly important in ink compositions that employ an anionic dye in combination with cationic fixing agents.

As further stated in the present application:

it is believed that incorporation of anionic lightfastness agents in accordance with the teachings of this invention promote the lightfastness of ternary mixtures of an anionic lightfastness-imparting agent and anionic dye in

association with a polyquaternary amine compound by separating the dye molecules associated with the anionic polymer with anionic reagents that can actively interact with photoexcited dye molecules to promote non-destructive recombination of photoexcited anionic radicals and intercept destructive free-radical intermediates.

Nothing in either of the references, viewed either alone or in combination, teaches or suggests such an ink. The Examiner appears to have considered various portions of the references cited, in each instance viewing the cited portion in isolation from the context of the entire reference, and combined these isolated portions to arrive at the present invention with the benefit of hindsight. Using hindsight or applying the benefit of the teachings of the present application when determining obviousness, however, is impermissible; the references applied must be reviewed without hindsight, must be reviewed as a whole, and must suggest the desirability of combining the references. Lindemann Maschinenfabrik v. American Hoist & Derrick Co., 221 U.S.P.Q. 481 (Fed. Cir. 1984). The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure. In re Dow Chemical, 5 U.S.P.Q. 2d 1529 (Fed. Cir. 1988). The Examiner is using Appellants' disclosure as a recipe for selecting the appropriate portions of the prior art to construct Appellants' ink. A piecemeal reconstruction of the prior art patents in light of Applicants' disclosure is not a basis for a holding of obviousness. In re Kamm et al., 172 U.S.P.Q. 298 (C.C.P.A. 1972). The mere fact that the prior art inks could have been modified does not make the modification obvious unless the prior art suggested the desirability of such a modification. In re Gordon, 221 U.S.P.Q. 1125, (Fed. Cir. 1984); Jones v. Hardy, 220 U.S.P.Q. 1021, (Fed. Cir. 1984).

The Examiner may be of the position that the invention claimed in the present application would be obvious to try after reviewing the cited references. Obvious to try, however, is not the standard by which

obviousness is determined under 35 U.S.C. §103. In re Geiger, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987); In re Yates, 211 U.S.P.Q. 1149 (CCPA 1981); In re Goodwin, 576 F.2d 375, 198 U.S.P.Q. 1 (CCPA 1978). Appellants direct attention to the decision in In re Geiger, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987). In this case, the invention was a method of inhibiting scale formation on and corrosion of metallic parts in cooling water systems by use of compositions containing (1) a sulfonated styrene/maleic anhydride (SSMA) copolymer, (2) a water soluble zinc compound, and (3) an organo-phosphorus acid compound or water soluble salt thereof. The Federal Circuit discussed three references cited against the claimed invention. The first, II, disclosed use in cooling water systems of scale and corrosion prevention compositions comprising a polymeric component in combination with one or more compounds selected from the group consisting of inorganic phosphoric acids and water soluble salts thereof, phosphonic acids and water soluble salts thereof, organic phosphoric acid esters and water soluble salts thereof, and polyvalent metal salts; the II polymeric component could contain maleic acid and styrene monomers, but there was no disclosure of the specific copolymer SSMA required in Geiger's claims. The second reference, Snyder '733, disclosed a method for treating cooling water systems prone to scale formation by the addition of a composition comprising an acrylic acid/lower alkyl/hydroxy acrylate copolymer and another polymeric component, which could be SSMA or a styrene/maleic anhydride copolymer; this reference noted that boiler and cooling water systems share a common problem in regard to scale deposit formation and that use of a styrene/maleic anhydride copolymer to prevent scale in boiler water systems was known. The third reference, Hwa, disclosed a method for treating boiler water systems that are prone to scale formation by addition of a composition comprising SSMA and an organo-phosphorus acid component. The Board had held that, based upon the prior art and the fact that each of the three components of the composition used in the claimed method were conventionally employed in the art for treating cooling water systems, it would have been *prima facie* obvious, within the meaning of 35 U.S.C. §103, to employ these components

in combination for their known functions and to optimize the amount of each additive. The Federal Circuit reversed, stating that it did not suggest use of SSMA as its claimed polymeric component and did not require the presence of an organophosphorus acid compound or a zinc compound, that although Snyder '733 disclosed the use of SSMA, it was for the purpose of showing that it, or one of three other specifically recited copolymers, could be used in combination with yet another polymeric component to prevent scale formation, and that while Hwa did disclose the specifically-recited organophosphorus acid compound, it provided no suggestion to add a zinc compound to its disclosed combination of SSMA and organophosphorus acid compounds, or to use SSMA in combination with an organophosphorus acid compound in the treatment of a cooling water system, where the characteristics could differ significantly from those in Hwa's boiler water system. The court concluded, "At best, in view of these disclosures, one skilled in the art might find it obvious to try various combinations of these known scale and corrosion prevention agents. However, this is not the standard of 35 U.S.C. §103." More recently, the Court of Appeals for the Federal Circuit has stated: "With hindsight, we could perhaps agree that the Houghton article seems like an obvious place to start to address the need in the power plant industry for an improved carbon-catalyzed deoxygenation process employing hydrazine that can be used commercially in a variety of applications. But, "obvious to try" is not the standard." Ecolochem Inc. v. Southern California Edison, 56 U.S.P.Q. 2d 1065, 1075 (Fed. Cir. 2000). Since nothing in the cited references, viewed in combination, teaches or suggests to one of ordinary skill in the art an ink as recited in claims 1 to 8, 11 to 20, and 22 to 25, Appellants are of the position that these claims are patentable with respect to the teachings of the cited references.

Appellants further point out that nothing in the combination of cited references teaches or suggests to one of ordinary skill in the art the present invention as recited in claim 12, which recites specific numbers of cationic sites on the polyquaternary amine molecule for every one anionic site on the lightfastness-imparting agent molecule, and claim 13, which

recites specific molar ratios of dye molecules to lightfastness-imparting agent molecules. Since the references do not teach or suggest the specific combination of polyquaternary amine and anionic lightfastness agent in an ink, these references further do not teach or suggest desirable ratios for these values. Accordingly, Appellants are of the position that these claims are particularly in condition for allowance.

In response to Appellants' position, the Examiner has stated that while there is no disclosure of anionic lightfastness agents in Gundlach et al. and no disclosure of a complex between an anionic dye, an anionic lightfastness agent, and a polyquaternary amine compound in Gundlach et al. or Vieira et al., Gundlach et al. discloses that upon mixing the anionic dye and the polyquaternary amine compound a complex is formed, and the combination of Gundlach et al. with Vieira et al. discloses an anionic dye, polyquaternary amine, and anionic lightfastness agent, and these ingredients would intrinsically form a complex as recited in the present claims. Similarly, the Examiner has stated that while there is no disclosure in Vieira et al. of a polyquaternary amine compound, this reference is used as a teaching reference, and that it is not necessary for this secondary reference to contain all of the features of the presently claimed invention; rather, this reference teaches a certain concept, namely the use of anionic lightfastness agents in ink jet inks, and that in combination with the primary reference, discloses the presently claimed invention.

Appellants, however, are of the position that one of ordinary skill in the art would not be motivated to combine the teachings of the references as the Examiner has done, for the previously stated reasons.

In response to Appellants' position that there is no motivation to combine the references as the Examiner has done, the Examiner has stated that Gundlach et al. is drawn to an ink jet ink and discloses an ink comprising anionic dye and a polyquaternary amine, that Vieira et al. is drawn to ink jet inks that comprise anionic dyes such as those utilized in Gundlach et al. and that Vieira et al. provides motivation for using an anionic lightfastness agent, i.e. to produce a stable ink that will not fade or discolor, that Vieira et al. is

drawn to the same field of endeavor as Gundlach et al., that Vieira et al. discloses motivation for using an anionic lightfastness agent, and that there is thus proper motivation to combine these references.

In response to Appellants' position that the Examiner's conclusion of obviousness is based on improper hindsight reasoning, the Examiner has stated that "it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper." The Examiner has cited In re McLaughlin, 443 F.2d 1392, 170 U.S.P.Q. 209 (C.C.P.A. 1971) as authority for this position.

Appellants disagree with these positions. None of the cited references suggests or teaches the desirability of combining the elements of the present invention as claimed. Obviousness cannot be established by combining references to arrive at the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. In re Geiger, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987); Carella v. Starlight Archery and Pro Line Co., 804 F.2d 135, 231 U.S.P.Q. 644 (Fed. Cir. 1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. (BNA) 929 (Fed. Cir. 1984). When determining patentability under §103, the Examiner must consider the invention as a whole, and cannot view each element of the claim separately with respect to the prior art. See, e.g., Jones v. Hardy, __ F.2d __, 220 U.S.P.Q. 1021 (BNA) (Fed. Cir. 1984). When prior art references require selective combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. Uniroyal Inc. v. Rudkin Wiley Corp., __ F. 2d __, 5 U.S.P.Q. 2d 1435 (Fed. Cir. 1988); Interconnect Planning Corp. v. Feil, 774 F. 2d 1132, 227 U.S.P.Q. 543 (Fed. Cir. 1985). It is impermissible to use the claims as a frame and the prior art references as a mosaic to piece together a facsimile of the claimed invention. Uniroyal Inc. v. Rudkin Wiley Corp., __ F. 2d __, 5 U.S.P.Q. 2d 1435 (Fed. Cir. 1988); W. L. Gore and Associates, Inc. v. Garlock, Inc., 721 F.

2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983). As the Court of Appeals for the Federal Circuit stated in In re Kotzab, 55 U.S.P.Q. 2d 1313, 1316-17 (Fed. Cir. 2000):

A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. See *Dembiczak*, 175 F.3d at 999, 50 U.S.P.Q.2D (BNA) at 1617. Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher." *Id.* (quoting *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. (BNA) 303, 313 (Fed. Cir. 1983)).

Most if not all inventions arise from a combination of old elements. See *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2D (BNA) 1453, 1457 (Fed. Cir. 1998). Thus, every element of a claimed invention may often be found in the prior art. See *id.* However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See *id.* Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. See *In re Dance*, 160 F.3d 1339, 1343, 48 U.S.P.Q.2D (BNA) 1635, 1637 (Fed. Cir. 1998); *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. (BNA) 1125, 1127 (Fed. Cir. 1984). Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. See *B.F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582, 37 U.S.P.Q.2D (BNA) 1314, 1318 (Fed. Cir. 1996).

The Board, in Ex Parte Levingood, 28 U.S.P.Q. 2d 1300 (Bd. Pat. App.& Int. 1993) reversed the rejection of all claims "because the examiner has used the wrong standard of obviousness.":

"Obviousness is a legal conclusion, the determination of which is a question of patent law. In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963). In order to

establish a *prima facie* case of obviousness, it is necessary for the examiner to present evidence¹, preferably in the form of some teaching, suggestion, incentive or inference in the applied prior art, or in the form of generally available knowledge, that one having ordinary skill in the art would have been led to combine the relevant teachings of the applied references in the proposed manner to arrive at the claimed invention. See, for example, Carella v. Starlight Archery, 804 F.2d 135, 231 USPQ 644 (Fed. Cir. 1986); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 227 USPQ 657 (Fed. Cir. 1985).

...

"...the examiner may provide an explanation based on logic and sound scientific reasoning that will support a holding of obviousness. In re Soli, 317 F.2d 941, 137 USPQ 797 (CCPA 1963)²...

...

"In this case, however, the only suggestion for the examiner's combination of the isolated teachings of the applied references improperly stems from appellant's disclosure and not from the applied prior art. In re Ehrreich, 590 F.2d 902, 200 USPQ 504 (CCPA 1979). At best, the examiner's comments regarding obviousness amount to an assertion that one of ordinary skill in the relevant art would have been able to arrive at appellant's invention because he had the necessary skills to carry out the requisite process steps. This is an inappropriate standard for obviousness. See Orthokinetics Inc. v. Safety Travel Chairs Inc., 806 F.2d 1565, 1 USPQ 2d 1081 (Fed. Cir. 1986). That which is within the capabilities of one skilled in the art is not synonymous with obviousness. Ex Parte Gerlach, 212 USPQ 471 (Bd. App. 1980). ... That one can reconstruct and/or explain the theoretical mechanism of an invention by means of logic and sound scientific reasoning does not afford the basis for an obviousness conclusion unless that logic and reasoning also supplies sufficient impetus to have led one of ordinary skill in the art to combine the teachings of the references to make the claimed invention.

"Our reviewing courts have often advised the Patent and Trademark Office that it can satisfy the burden of establishing a *prima facie* case of obviousness only by showing some objective teaching in either the prior art, or knowledge generally available to one of ordinary skill in the art, that 'would lead' that individual 'to combine the relevant teachings of the references.' In re Fine,

837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). In re Newell, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Accordingly, an examiner cannot establish obviousness by locating references which describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done."

1. The importance of evidence in the examination process is set forth in the following quotation from In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984): "The Supreme Court in Graham v. John Deere Co., 383 U.S. 1, 148 U.S.P.Q. 459 (1966), focused on the procedural and evidentiary processes in reaching a conclusion under section 103. As adapted to ex parte procedure, Graham is interpreted as continuing to place the 'burden of proof on the Patent Office which requires it to produce the factual basis for its rejection of an application under sections 102 and 103'. In re Warner, 379 F.2d 1011, 1016, 154 USPQ 173, 177 (CCPA 1967). After a *prima facie* case of obviousness has been established, the burden of going forward shifts to the applicant."
2. Preferably the examiner's explanation should be such that it provides that impetus necessary to cause one skilled in the art to combine the teachings of the references to make the proposed modification. In re Albrecht, 514 F.2d 1385, 185 USPQ 585 (CCPA 1975).

As the Court of Appeals for the Federal Circuit recently stated in Yamanouchi Pharmaceutical Co. v. Danbury Pharmacal Inc., 56 U.S.P.Q. 2d 1641 (Fed. Cir. 2000) at 1644:

This court has recently reemphasized the importance of the motivation to combine:

As this court has stated, "virtually all (inventions) are combinations of old elements." Therefore, an examiner (or accused infringer) may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting

patents solely by finding prior art corollaries for the claimed elements would permit an examiner (or accused infringer) to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention.

....

... To counter this potential weakness in the obviousness construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

In re Rouffet, 149 F.3d 1350, 1357-58, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998) (internal citations omitted).

For the instant application, the Examiner also appears to have attempted to use the claimed invention as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. This method is clearly impermissible. Nothing in any of the cited references teaches or suggests the combination of elements recited in the instant claims.

In response to Appellants' position that there is no disclosure in any of the cited references of the number of cationic sites on the polyquaternary amine for every one anionic site on the lightfastness agent or for every one anionic site on the anionic dye, the Examiner has stated that while there is no explicit disclosure in the cited prior art of the number of cationic sites on the polyquaternary amine for every one anionic site on the lightfastness agent or for every one anionic site on the anionic dye, Gundlach et al. discloses that the number of cationic sites on the polyquaternary amine compound must be larger than the number of anionic sites on the dye to prevent precipitation of the polymer, and that since Gundlach et al. discloses that the number of cationic groups should be larger than the number of anionic groups to avoid precipitation, it would have been obvious to one of ordinary skill in the art, absent evidence to the contrary, to control the number of cationic sites on the polyquaternary amine per one anionic site on the dye or per one anionic site on the lightfastness imparting agent to values,

including that presently claimed, to prevent precipitation and to produce an ink with excellent shelf stability, thereby arriving at the claimed invention.

Appellants disagree with this position. While Gundlach et al. provides general guidance with respect to desirable ratios of anionic dye to polyquaternary amine, it does not provide guidance to one of ordinary skill in the art in determining desirable relative ratios of anionic lightfastness-imparting agent to polyquaternary amine molecule when the ink contains a complex of an anionic dye, an anionic lightfastness-imparting agent, and a polyquaternary amine compound. In addition, this reference provides no guidance to one of ordinary skill in the art in determining desirable relative ratios of anionic lightfastness-imparting agent to anionic dye when the ink contains a complex of an anionic dye, an anionic lightfastness-imparting agent, and a polyquaternary amine compound. Accordingly, Appellants remain of the position that claims 12 and 13 are particularly in condition for allowance.

Further in response to this position, the Examiner has stated that Gundlach et al discloses using 1 to 5 percent anionic dye while Vieira et al. discloses using 0.1 to 2 percent anionic lightfastness agent. Appellants point out that (a) this ratio is not directed to the two components complexed to a polyquaternary amine, and (b) this ratio is substantially broader than that recited in claim 13. Accordingly, Appellants remain of the position that claim 13 is particularly in condition for allowance.

While the Examiner has established that each of the cited references has advantages of its own, the Examiner has failed to establish that one of ordinary skill in the art would be motivated to select these particular references and combine them as suggested by the Examiner to arrive at the instantly claimed invention. Accordingly, Appellants are of the position that the present invention is patentable with respect to the cited references.

2. Claims 1 to 7, 11 to 20, and 22 to 25 are Patentable Under 35 U.S.C. §103(a) Over Gundlach et al. (U.S. Patent 6,054,505) in View of Yokoyama et al. (U.S. Patent 4,256,493).

The Examiner has rejected claims 1 to 7, 11 to 20, and 22 to 25 under 35 U.S.C. §103(a) as being unpatentable over Gundlach et al. (U.S. Patent 6,054,505) in view of Yokoyama et al. (U.S. Patent 4,256,493).

Gundlach et al. discloses an ink composition which comprises (1) water; (2) a nonpolymeric salt comprising at least one cation and at least one anion; and (3) a colorant comprising an anionic dye complexed with a polyquaternary amine compound. Also disclosed is an ink composition which comprises (1) water; (2) a nonpolymeric salt comprising at least one cation and at least one anion; (3) an anionic dye; and (4) a polyquaternary amine compound. In one embodiment, the polyquaternary amine compound is selected from the group consisting of polydiallyl ammonium compounds, polyquaternized polyvinylamines, polyquaternized polyallylamines, epichlorohydrin/amine copolymers, cationic amido amine copolymers, copolymers of vinyl pyrrolidinone and a vinyl imidazolium salt, and mixtures thereof. The reference further discloses that other optional additives can be present in the inks, including pH controlling agents such as acids or bases, phosphate salts, carboxylate salts, sulfite salts, amine salts, and the like.

Yokoyama et al. discloses a jet ink composition which comprises an aqueous jet ink containing a water-soluble dye, a wetting agent, and water as main components and, incorporated therein, a water-soluble ultraviolet absorbing agent, as well as a metal salt, when necessary.

The Examiner has stated that Gundlach et al. discloses an ink comprising water, 0.1 to 40 percent nonpolymeric salt, 1 to 5 percent anionic dye, and a polyquaternary amine such as polydiallyl dimethyl ammonium, polyquaternized polyvinylamine, polyquaternized polyallylamine, epichlorohydrin/amine, cationic amido amine, and copolymers of vinyl pyrrolidone and vinyl imidazolium salt, that the reference discloses that the ink is preferably printed using a thermal ink jet printer but also discloses the

use of other conventionally known ink jet printing methods such as acoustic ink jet printing and piezoelectric ink jet printing, that the difference between this reference and the present claimed invention is the requirement in the claims of (a) an anionic lightfastness-imparting agent, and (b) the number of cationic sites on the polyquaternary amine per one anionic site on the dye or the number of cationic sites on the polyquaternary amine per one anionic site on the lightfastness imparting agent, that with respect to difference (a), Yokoyama et al., which is drawn to ink jet inks, discloses the use of UV absorbing agents such as 2-hydroxy-4-methoxybenzophenone-5-sulfonic acid or 2,2'-dihydroxy-4,4'-dimethoxybenzophenone-5-sulfonic acid to produce ink with good resistance to light that will not clog the printer nozzles, that although there is no disclosure in either Gundlach et al. or Yokoyama et al. of complex of dye, polyquaternary amine, and lightfastness imparting agent as presently claimed, given that Gundlach et al. discloses that upon mixing the ink ingredients, the anionic dye and the polyquaternary amine compound form a complex and given that Gundlach et al. in view of Yokoyama et al. disclose anionic dye, polyquaternary amine, and lightfastness imparting agent identical to those presently claimed, these ingredients will intrinsically form a complex, that in light of the motivation for using lightfastness imparting agents disclosed by Yokoyama et al., it would have been obvious to one of ordinary skill in the art to use such lightfastness imparting agent in the ink of Gundlach et al. to produce an ink with good resistance to light that will not clog the printer nozzles and thereby arrive at the claimed invention, that with respect to difference (b), Gundlach et al. discloses that the number of cationic sites on the polyquaternary amine compound must be larger than the number of anionic sites on the dye to avoid the polymer from precipitating, but contains no explicit disclosure of the number of cationic sites on the polyquaternary amine per one anionic site on the dye or the number of cationic sites on the polyquaternary amine per one anionic site on the lightfastness imparting agent, and that given that Gundlach et al. discloses that the number of cationic groups should be larger than the number of anionic groups to avoid precipitation, it would have been obvious

to one of ordinary skill in the art to control the number of cationic sites on the polyquaternary amine per one anionic site on the dye or per one anionic site on the lightfastness imparting agent to values, including that presently claimed, to prevent precipitation and to produce an ink with excellent shelf stability and thereby arrive at the claimed invention. The Examiner is thus of the position that these references, viewed in combination, render obvious the present invention as recited in claims 1 to 7, 11 to 20, and 22 to 25.

Appellants disagree with this position. Gundlach et al. neither teaches nor suggests the use of lightfastness agents such as ultraviolet absorbers, thiosulfate salts, trithionate salts, or tetrathionate salts in the inks disclosed therein. Yokoyama et al. teaches simple addition of ultraviolet absorbing agents into inks, and neither teaches nor suggests that such agents could or should form complexes with other ink ingredients. Yokoyama et al. further fails to teach or suggest inks containing polyquaternary amines. One of ordinary skill in the art would not be motivated to view these particular references in combination and would not be led to make an ink wherein both an anionic dye and an anionic lightfastness-imparting agent are complexed to a polyquaternary amine. As stated in the present application:

it is believed that in the inks according to the present invention, the lightfastness-imparting agent and the anionic dye are both complexed to the polyquaternary amine compound, and are thus in close proximity to each other; accordingly, the lightfastness-imparting agent is always in a location wherein it can function most efficaciously in protecting the chromophore from degradation caused by short wave radiation such as ultraviolet radiation. This protection is particularly important in ink compositions that employ an anionic dye in combination with cationic fixing agents.

As further stated in the present application:

it is believed that incorporation of anionic lightfastness agents in accordance with the teachings of this invention promote the lightfastness of ternary mixtures of an anionic lightfastness-imparting agent and anionic dye in association with a polyquaternary amine compound by separating the dye

molecules associated with the anionic polymer with anionic reagents that can actively interact with photoexcited dye molecules to promote non-destructive recombination of photoexcited anionic radicals and intercept destructive free-radical intermediates.

Nothing in either of the references, viewed either alone or in combination, teaches or suggests such an ink. The Examiner appears to have considered various portions of the references cited, in each instance viewing the cited portion in isolation from the context of the entire reference, and combined these isolated portions to arrive at the present invention with the benefit of hindsight. Using hindsight or applying the benefit of the teachings of the present application when determining obviousness, however, is impermissible; the references applied must be reviewed without hindsight, must be reviewed as a whole, and must suggest the desirability of combining the references. Lindemann Maschinenfabrik v. American Hoist & Derrick Co., 221 U.S.P.Q. 481 (Fed. Cir. 1984). The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure. In re Dow Chemical, 5 U.S.P.Q. 2d 1529 (Fed. Cir. 1988). The Examiner is using Appellants' disclosure as a recipe for selecting the appropriate portions of the prior art to construct Appellants' ink. A piecemeal reconstruction of the prior art patents in light of Applicants' disclosure is not a basis for a holding of obviousness. In re Kamm et al., 172 U.S.P.Q. 298 (C.C.P.A. 1972). The mere fact that the prior art inks could have been modified does not make the modification obvious unless the prior art suggested the desirability of such a modification. In re Gordon, 221 U.S.P.Q. 1125, (Fed. Cir. 1984); Jones v. Hardy, 220 U.S.P.Q. 1021, (Fed. Cir. 1984).

The Examiner may be of the position that the invention claimed in the present application would be obvious to try after reviewing the cited references. Obvious to try, however, is not the standard by which obviousness is determined under 35 U.S.C. §103. In re Geiger, 2 U.S.P.Q. 2d

1276 (Fed. Cir. 1987); In re Yates, 211 U.S.P.Q. 1149 (CCPA 1981); In re Goodwin, 576 F.2d 375, 198 U.S.P.Q. 1 (CCPA 1978). Appellants direct attention to the decision in In re Geiger, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987). In this case, the invention was a method of inhibiting scale formation on and corrosion of metallic parts in cooling water systems by use of compositions containing (1) a sulfonated styrene/maleic anhydride (SSMA) copolymer, (2) a water soluble zinc compound, and (3) an organo-phosphorus acid compound or water soluble salt thereof. The Federal Circuit discussed three references cited against the claimed invention. The first, II, disclosed use in cooling water systems of scale and corrosion prevention compositions comprising a polymeric component in combination with one or more compounds selected from the group consisting of inorganic phosphoric acids and water soluble salts thereof, phosphonic acids and water soluble salts thereof, organic phosphoric acid esters and water soluble salts thereof, and polyvalent metal salts; the II polymeric component could contain maleic acid and styrene monomers, but there was no disclosure of the specific copolymer SSMA required in Geiger's claims. The second reference, Snyder '733, disclosed a method for treating cooling water systems prone to scale formation by the addition of a composition comprising an acrylic acid/lower alkyl/hydroxy acrylate copolymer and another polymeric component, which could be SSMA or a styrene/maleic anhydride copolymer; this reference noted that boiler and cooling water systems share a common problem in regard to scale deposit formation and that use of a styrene/maleic anhydride copolymer to prevent scale in boiler water systems was known. The third reference, Hwa, disclosed a method for treating boiler water systems that are prone to scale formation by addition of a composition comprising SSMA and an organo-phosphorus acid component. The Board had held that, based upon the prior art and the fact that each of the three components of the composition used in the claimed method were conventionally employed in the art for treating cooling water systems, it would have been *prima facie* obvious, within the meaning of 35 U.S.C. §103, to employ these components in combination for their known functions and to optimize the amount of each

additive. The Federal Circuit reversed, stating that it did not suggest use of SSMA as its claimed polymeric component and did not require the presence of an organophosphorus acid compound or a zinc compound, that although Snyder '733 disclosed the use of SSMA, it was for the purpose of showing that it, or one of three other specifically recited copolymers, could be used in combination with yet another polymeric component to prevent scale formation, and that while Hwa did disclose the specifically-recited organophosphorus acid compound, it provided no suggestion to add a zinc compound to its disclosed combination of SSMA and organophosphorus acid compounds, or to use SSMA in combination with an organophosphorus acid compound in the treatment of a cooling water system, where the characteristics could differ significantly from those in Hwa's boiler water system. The court concluded, "At best, in view of these disclosures, one skilled in the art might find it obvious to try various combinations of these known scale and corrosion prevention agents. However, this is not the standard of 35 U.S.C. §103." More recently, the Court of Appeals for the Federal Circuit has stated: "With hindsight, we could perhaps agree that the Houghton article seems like an obvious place to start to address the need in the power plant industry for an improved carbon-catalyzed deoxygenation process employing hydrazine that can be used commercially in a variety of applications. But, "obvious to try" is not the standard." Ecolochem Inc. v. Southern California Edison, 56 U.S.P.Q. 2d 1065, 1075 (Fed. Cir. 2000). Since nothing in the cited references, viewed in combination, teaches or suggests to one of ordinary skill in the art an ink as recited in claims 1 to 7, 11 to 20, and 22 to 25, Appellants are of the position that these claims are patentable with respect to the teachings of the cited references.

Appellants further point out that nothing in the combination of cited references teaches or suggests to one of ordinary skill in the art the present invention as recited in claim 12, which recites specific numbers of cationic sites on the polyquaternary amine molecule for every one anionic site on the lightfastness-imparting agent molecule, and claim 13, which recites specific molar ratios of dye molecules to lightfastness-imparting agent

molecules. Since the references do not teach or suggest the specific combination of polyquaternary amine and anionic lightfastness agent in an ink, these references further do not teach or suggest desirable ratios for these values. Accordingly, Appellants are of the position that these claims are particularly in condition for allowance.

In response to Appellants' position, the Examiner has stated that while there is no disclosure of anionic lightfastness agents in Gundlach et al. and no disclosure of a complex between an anionic dye, an anionic lightfastness agent, and a polyquaternary amine compound in Gundlach et al. or Yokoyama et al., Gundlach et al. discloses that upon mixing the anionic dye and the polyquaternary amine compound a complex is formed, and the combination of Gundlach et al. with Yokoyama et al. discloses an anionic dye, polyquaternary amine, and anionic lightfastness agent, and these ingredients would intrinsically form a complex as recited in the present claims. Similarly, the Examiner has stated that while there is no disclosure in Yokoyama et al. of a polyquaternary amine compound, this reference is used as teaching reference, and that it is not necessary for this secondary reference to contain all of the features of the presently claimed invention; rather, this reference teaches a certain concept, namely the use of anionic lightfastness agents in ink jet inks, and that in combination with the primary reference, discloses the presently claimed invention.

Appellants, however, are of the position that one of ordinary skill in the art would not be motivated to combine the teachings of the references as the Examiner has done, for the previously stated reasons.

In response to Appellants' position that there is no motivation to combine the references as the Examiner has done, the Examiner has stated that Gundlach et al. is drawn to an ink jet ink and discloses an ink comprising anionic dye and a polyquaternary amine, that Yokoyama et al. is drawn to ink jet inks that comprise anionic dyes such as those utilized in Gundlach et al. and that Yokoyama et al. provides motivation for using an anionic lightfastness agent, i.e. to produce ink with good resistance to light that will not clog the printer nozzles, that Yokoyama et al. is drawn to the same field of

endeavor as Gundlach et al., that Yokoyama et al. discloses motivation for using an anionic lightfastness agent, and that there is thus proper motivation to combine these references.

In response to Appellants' position that the Examiner's conclusion of obviousness is based on improper hindsight reasoning, the Examiner has stated that "it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper." The Examiner has cited In re McLaughlin, 443 F.2d 1392, 170 U.S.P.Q. 209 (C.C.P.A. 1971) as authority for this position.

Appellants disagree with these positions. None of the cited references suggests or teaches the desirability of combining the elements of the present invention as claimed. Obviousness cannot be established by combining references to arrive at the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. In re Geiger, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987); Carella v. Starlight Archery and Pro Line Co., 804 F.2d 135, 231 U.S.P.Q. 644 (Fed. Cir. 1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. (BNA) 929 (Fed. Cir. 1984). When determining patentability under §103, the Examiner must consider the invention as a whole, and cannot view each element of the claim separately with respect to the prior art. See, e.g., Jones v. Hardy, __ F.2d __, 220 U.S.P.Q. 1021 (BNA) (Fed. Cir. 1984). When prior art references require selective combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. Uniroyal Inc. v. Rudkin Wiley Corp., __ F. 2d __, 5 U.S.P.Q. 2d 1435 (Fed. Cir. 1988); Interconnect Planning Corp. v. Feil, 774 F. 2d 1132, 227 U.S.P.Q. 543 (Fed. Cir. 1985). It is impermissible to use the claims as a frame and the prior art references as a mosaic to piece together a facsimile of the claimed invention. Uniroyal Inc. v. Rudkin Wiley Corp., __ F. 2d __, 5 U.S.P.Q. 2d 1435 (Fed. Cir. 1988); W. L. Gore and Associates, Inc. v. Garlock, Inc., 721 F.

2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983). As the Court of Appeals for the Federal Circuit stated in In re Kotzab, 55 U.S.P.Q. 2d 1313, 1316-17 (Fed. Cir. 2000):

A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. See *Dembiczak*, 175 F.3d at 999, 50 U.S.P.Q.2D (BNA) at 1617. Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher." *Id.* (quoting *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. (BNA) 303, 313 (Fed. Cir. 1983)).

Most if not all inventions arise from a combination of old elements. See *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2D (BNA) 1453, 1457 (Fed. Cir. 1998). Thus, every element of a claimed invention may often be found in the prior art. See *id.* However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See *id.* Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. See *In re Dance*, 160 F.3d 1339, 1343, 48 U.S.P.Q.2D (BNA) 1635, 1637 (Fed. Cir. 1998); *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. (BNA) 1125, 1127 (Fed. Cir. 1984). Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. See *B.F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582, 37 U.S.P.Q.2D (BNA) 1314, 1318 (Fed. Cir. 1996).

The Board, in Ex Parte Levengood, 28 U.S.P.Q. 2d 1300 (Bd. Pat. App.& Int. 1993) reversed the rejection of all claims "because the examiner has used the wrong standard of obviousness.":

"Obviousness is a legal conclusion, the determination of which is a question of patent law. In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963). In order to

establish a *prima facie* case of obviousness, it is necessary for the examiner to present evidence¹, preferably in the form of some teaching, suggestion, incentive or inference in the applied prior art, or in the form of generally available knowledge, that one having ordinary skill in the art would have been led to combine the relevant teachings of the applied references in the proposed manner to arrive at the claimed invention. See, for example, Carella v. Starlight Archery, 804 F.2d 135, 231 USPQ 644 (Fed. Cir. 1986); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 227 USPQ 657 (Fed. Cir. 1985).

...

"...the examiner may provide an explanation based on logic and sound scientific reasoning that will support a holding of obviousness. In re Soli, 317 F.2d 941, 137 USPQ 797 (CCPA 1963)²..."

...

"In this case, however, the only suggestion for the examiner's combination of the isolated teachings of the applied references improperly stems from appellant's disclosure and not from the applied prior art. In re Ehrreich, 590 F.2d 902, 200 USPQ 504 (CCPA 1979). At best, the examiner's comments regarding obviousness amount to an assertion that one of ordinary skill in the relevant art would have been able to arrive at appellant's invention because he had the necessary skills to carry out the requisite process steps. This is an inappropriate standard for obviousness. See Orthokinetics Inc. v. Safety Travel Chairs Inc., 806 F.2d 1565, 1 USPQ 2d 1081 (Fed. Cir. 1986). That which is within the capabilities of one skilled in the art is not synonymous with obviousness. Ex Parte Gerlach, 212 USPQ 471 (Bd. App. 1980). ... That one can reconstruct and/or explain the theoretical mechanism of an invention by means of logic and sound scientific reasoning does not afford the basis for an obviousness conclusion unless that logic and reasoning also supplies sufficient impetus to have led one of ordinary skill in the art to combine the teachings of the references to make the claimed invention.

"Our reviewing courts have often advised the Patent and Trademark Office that it can satisfy the burden of establishing a *prima facie* case of obviousness only by showing some objective teaching in either the prior art, or knowledge generally available to one of ordinary skill in the art, that 'would lead' that individual 'to combine the relevant teachings of the references.' In re Fine,

837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). In re Newell, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Accordingly, an examiner cannot establish obviousness by locating references which describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done."

1. The importance of evidence in the examination process is set forth in the following quotation from In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984): "The Supreme Court in Graham v. John Deere Co., 383 U.S. 1, 148 U.S.P.Q. 459 (1966), focused on the procedural and evidentiary processes in reaching a conclusion under section 103. As adapted to ex parte procedure, Graham is interpreted as continuing to place the 'burden of proof on the Patent Office which requires it to produce the factual basis for its rejection of an application under sections 102 and 103'. In re Warner, 379 F.2d 1011, 1016, 154 USPQ 173, 177 (CCPA 1967). After a *prima facie* case of obviousness has been established, the burden of going forward shifts to the applicant."
2. Preferably the examiner's explanation should be such that it provides that impetus necessary to cause one skilled in the art to combine the teachings of the references to make the proposed modification. In re Albrecht, 514 F.2d 1385, 185 USPQ 585 (CCPA 1975).

As the Court of Appeals for the Federal Circuit recently stated in Yamanouchi Pharmaceutical Co. v. Danbury Pharmacal Inc., 56 U.S.P.Q. 2d 1641 (Fed. Cir. 2000) at 1644:

This court has recently reemphasized the importance of the motivation to combine:

As this court has stated, "virtually all (inventions) are combinations of old elements." Therefore, an examiner (or accused infringer) may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting

patents solely by finding prior art corollaries for the claimed elements would permit an examiner (or accused infringer) to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention.

....

... To counter this potential weakness in the obviousness construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

In re Rouffet, 149 F.3d 1350, 1357-58, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998) (internal citations omitted).

For the instant application, the Examiner also appears to have attempted to use the claimed invention as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. This method is clearly impermissible. Nothing in any of the cited references teaches or suggests the combination of elements recited in the instant claims.

In response to Appellants' position that there is no disclosure in any of the cited references of the number of cationic sites on the polyquaternary amine for every one anionic site on the lightfastness agent or for every one anionic site on the anionic dye, the Examiner has stated that while there is no explicit disclosure in the cited prior art of the number of cationic sites on the polyquaternary amine for every one anionic site on the lightfastness agent or for every one anionic site on the anionic dye, Gundlach et al. discloses that the number of cationic sites on the polyquaternary amine compound must be larger than the number of anionic sites on the dye to prevent precipitation of the polymer, and that since Gundlach et al. discloses that the number of cationic groups should be larger than the number of anionic groups to avoid precipitation, it would have been obvious to one of ordinary skill in the art, absent evidence to the contrary, to control the number of cationic sites on the polyquaternary amine per one anionic site on the dye or per one anionic site on the lightfastness imparting agent to values,

including that presently claimed, to prevent precipitation and to produce an ink with excellent shelf stability, thereby arriving at the claimed invention.

Appellants disagree with this position. While Gundlach et al. provides general guidance with respect to desirable ratios of anionic dye to polyquaternary amine, it does not provide guidance to one of ordinary skill in the art in determining desirable relative ratios of anionic lightfastness-imparting agent to polyquaternary amine molecule when the ink contains a complex of an anionic dye, an anionic lightfastness-imparting agent, and a polyquaternary amine compound. In addition, this reference provides no guidance to one of ordinary skill in the art in determining desirable relative ratios of anionic lightfastness-imparting agent to anionic dye when the ink contains a complex of an anionic dye, an anionic lightfastness-imparting agent, and a polyquaternary amine compound. Accordingly, Appellants remain of the position that claims 12 and 13 are particularly in condition for allowance.

Further in response to this position, the Examiner has stated that column 5, lines 26 to 32 of Yokoyama et al. discloses a ratio of anionic dye to UV absorbing agent of 0.1-10:0.2-10, or 0.01:1 to 50:1. Appellants point out that (a) this ratio is directed to ingredients moving freely in an aqueous ink, not ingredients complexed to a polyquaternary amine, and (b) this ratio is substantially broader than that recited in claim 13. Accordingly, Appellants remain of the position that claim 13 is particularly in condition for allowance.

While the Examiner has established that each of the cited references has advantages of its own, the Examiner has failed to establish that one of ordinary skill in the art would be motivated to select these particular references and combine them as suggested by the Examiner to arrive at the instantly claimed invention. Accordingly, Appellants are of the position that the present invention is patentable with respect to the cited references.

3. Claims 1 to 4 and 10 to 25 are Patentable Under 35 U.S.C. §103(a) Over Gundlach et al. (U.S. Patent 6,054,505) in View of Either Bergthaller et al. (U.S. Patent 5,855,657) or Ma et al. (U.S. Patent 6,432,523).

The Examiner has rejected claims 1 to 4 and 10 to 25 under §103 as being unpatentable over Gundlach et al. in view of either Bergthaller et al. or Ma et al.

Gundlach et al. discloses an ink composition which comprises (1) water; (2) a nonpolymeric salt comprising at least one cation and at least one anion; and (3) a colorant comprising an anionic dye complexed with a polyquaternary amine compound. Also disclosed is an ink composition which comprises (1) water; (2) a nonpolymeric salt comprising at least one cation and at least one anion; (3) an anionic dye; and (4) a polyquaternary amine compound. In one embodiment, the polyquaternary amine compound is selected from the group consisting of polydiallyl ammonium compounds, polyquaternized polyvinylamines, polyquaternized polyallylamines, epichlorohydrin/amine copolymers, cationic amido amine copolymers, copolymers of vinyl pyrrolidinone and a vinyl imidazolium salt, and mixtures thereof. The reference further discloses that other optional additives can be present in the inks, including pH controlling agents such as acids or bases, phosphate salts, carboxylate salts, sulfite salts, amine salts, and the like.

Bergthaller et al. discloses an ink jet ink that results in improved color-fastness if the ink contains a water-soluble inorganic thiosulphate, trithionate, or tetrathionate or an organic thiosulfate, in an amount of 0.2 to 8 percent by weight with respect to the ink base.

Ma et al. discloses a process wherein at least one of the following compounds is included on a surface layer of a print medium and in an ink jet ink formulation to be printed thereon: potassium iodide, sodium iodide, sodium thiosulfate, potassium thiosulfate, and sodium thiocyanate. The addition of at least one of these compounds to both the print medium and the ink jet ink can improve lightfastness on the order of eight to thirteen times or more on porous glossy media. These additives are particularly

effective with water soluble dyes, including such dyes as Reactive Black 31, Direct Blue 199, Magenta 377, and Direct Yellow 132.

The Examiner has stated that Gundlach et al. discloses an ink comprising water, 0.1 to 40 percent nonpolymeric salt, 1 to 5 percent anionic dye including Acid Red 52, Acid Yellow 23, and Acid Blue 9, and a polyquaternary amine such as polydiallyl dimethyl ammonium, polyquaternized polyvinylamine, polyquaternized polyallylamine, epichlorohydrin/amine, cationic amido amine, and copolymers of vinyl pyrrolidone and vinyl imidazolium salt, that the reference discloses that the ink is preferably printed using a thermal ink jet printer but also discloses the use of other conventionally known ink jet printing methods such as acoustic ink jet printing and piezoelectric ink jet printing, and that the difference between this reference and the present claimed invention is the requirement in the claims of (a) an anionic lightfastness-imparting agent, and (b) the number of cationic sites on the polyquaternary amine per one anionic site on the dye or the number of cationic sites on the polyquaternary amine per one anionic site on the lightfastness imparting agent.

The Examiner has stated that with respect to difference (a), Bergthaller et al., which is drawn to ink jet inks containing dyes including anionic dyes such as Acid dyes, discloses the use of 0.2 to 8 percent thiosulfate, trithionate, or tetrathionate salts to produce ink with improved colorfastness, that alternatively, Ma et al., which is drawn to ink jet inks, discloses the use of 1 to 8 percent thiosulfate salt to improve lightfastness, and that in light of the motivation for using anionic lightfastness agents as disclosed by either Bergthaller et al. or ma et al., it would have been obvious to one of ordinary skill in the art to use such lightfastness agents in the ink of Gundlach et al. to produce an ink with improved colorfastness or lightfastness and thereby arrive at the claimed invention.

The Examiner has stated that with respect to difference (b), Gundlach et al. discloses that the number of cationic sites on the polyquaternary amine compound must be larger than the number of anionic sites on the dye to prevent the polymer from precipitating, but contains no

explicit disclosure of the number of cationic sites on the polyquaternary amine per one anionic site on the dye or the number of cationic sites on the polyquaternary amine per one anionic site on the lightfastness imparting agent, and that given that Gundlach et al. discloses that the number of cationic groups should be larger than the number of anionic groups to avoid precipitation, it would have been obvious to one of ordinary skill in the art to control the number of cationic sites on the polyquaternary amine per one anionic site on the dye or per one anionic site on the lightfastness imparting agent to values, including that presently claimed, to prevent precipitation and to produce an ink with excellent shelf stability and thereby arrive at the claimed invention. The Examiner is thus of the position that these references, viewed in combination, render obvious the present invention as recited in claims 1 to 4 and 10 to 25.

Appellants disagree with this position. Gundlach et al. neither teaches nor suggests the use of lightfastness agents such as ultraviolet absorbers, thiosulfate salts, trithionate salts, or tetrathionate salts in the inks disclosed therein. Bergthaller et al. and Ma et al. both teach simple addition of lightfastness agents into inks, and neither teach nor suggest that such agents could or should form complexes with other ink ingredients. Bergthaller et al. and Ma et al. further fail to teach or suggest inks containing polyquaternary amines. One of ordinary skill in the art would not be motivated to view these particular references in combination and would not be led to make an ink wherein both an anionic dye and an anionic lightfastness-imparting agent are complexed to a polyquaternary amine. As stated in the present application:

It is believed that in the inks according to the present invention, the lightfastness-imparting agent and the anionic dye are both complexed to the polyquaternary amine compound, and are thus in close proximity to each other; accordingly, the lightfastness-imparting agent is always in a location wherein it can function most efficaciously in protecting the chromophore from degradation caused by short wave radiation such as ultraviolet radiation. This

protection is particularly important in ink compositions that employ an anionic dye in combination with cationic fixing agents.

As further stated in the present application:

it is believed that incorporation of anionic lightfastness agents in accordance with the teachings of this invention promote the lightfastness of ternary mixtures of an anionic lightfastness-imparting agent and anionic dye in association with a polyquaternary amine compound by separating the dye molecules associated with the anionic polymer with anionic reagents that can actively interact with photoexcited dye molecules to promote non-destructive recombination of photoexcited anionic radicals and intercept destructive free-radical intermediates.

Nothing in any of these references, viewed either alone or in combination, teaches or suggests such an ink. The Examiner appears to have considered various portions of the references cited, in each instance viewing the cited portion in isolation from the context of the entire reference, and combined these isolated portions to arrive at the present invention with the benefit of hindsight. Using hindsight or applying the benefit of the teachings of the present application when determining obviousness, however, is impermissible; the references applied must be reviewed without hindsight, must be reviewed as a whole, and must suggest the desirability of combining the references. Lindemann Maschinenfabrik v. American Hoist & Derrick Co., 221 U.S.P.Q. 481 (Fed. Cir. 1984). The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure. In re Dow Chemical, 5 U.S.P.Q. 2d 1529 (Fed. Cir. 1988). The Examiner is using Appellants' disclosure as a recipe for selecting the appropriate portions of the prior art to construct Appellants' ink. A piecemeal reconstruction of the prior art patents in light of Applicants' disclosure is not a basis for a holding of obviousness. In re Kamm et al., 172

U.S.P.Q. 298 (C.C.P.A. 1972). The mere fact that the prior art inks could have been modified does not make the modification obvious unless the prior art suggested the desirability of such a modification. In re Gordon, 221 U.S.P.Q. 1125, (Fed. Cir. 1984); Jones v. Hardy, 220 U.S.P.Q. 1021, (Fed. Cir. 1984).

The Examiner may be of the position that the invention claimed in the present application would be obvious to try after reviewing the cited references. Obvious to try, however, is not the standard by which obviousness is determined under 35 U.S.C. §103. In re Geiger, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987); In re Yates, 211 U.S.P.Q. 1149 (CCPA 1981); In re Goodwin, 576 F.2d 375, 198 U.S.P.Q. 1 (CCPA 1978). Appellants direct attention to the decision in In re Geiger, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987). In this case, the invention was a method of inhibiting scale formation on and corrosion of metallic parts in cooling water systems by use of compositions containing (1) a sulfonated styrene/maleic anhydride (SSMA) copolymer, (2) a water soluble zinc compound, and (3) an organo-phosphorus acid compound or water soluble salt thereof. The Federal Circuit discussed three references cited against the claimed invention. The first, II, disclosed use in cooling water systems of scale and corrosion prevention compositions comprising a polymeric component in combination with one or more compounds selected from the group consisting of inorganic phosphoric acids and water soluble salts thereof, phosphonic acids and water soluble salts thereof, organic phosphoric acid esters and water soluble salts thereof, and polyvalent metal salts; the II polymeric component could contain maleic acid and styrene monomers, but there was no disclosure of the specific copolymer SSMA required in Geiger's claims. The second reference, Snyder '733, disclosed a method for treating cooling water systems prone to scale formation by the addition of a composition comprising an acrylic acid/lower alkyl/hydroxy acrylate copolymer and another polymeric component, which could be SSMA or a styrene/maleic anhydride copolymer; this reference noted that boiler and cooling water systems share a common problem in regard to scale deposit formation and that use of a styrene/maleic anhydride copolymer to prevent scale in boiler water systems was known. The third

reference, Hwa, disclosed a method for treating boiler water systems that are prone to scale formation by addition of a composition comprising SSMA and an organo-phosphorus acid component. The Board had held that, based upon the prior art and the fact that each of the three components of the composition used in the claimed method were conventionally employed in the art for treating cooling water systems, it would have been *prima facie* obvious, within the meaning of 35 U.S.C. §103, to employ these components in combination for their known functions and to optimize the amount of each additive. The Federal Circuit reversed, stating that *Id.* did not suggest use of SSMA as its claimed polymeric component and did not require the presence of an organophosphorus acid compound or a zinc compound, that although Snyder '733 disclosed the use of SSMA, it was for the purpose of showing that it, or one of three other specifically recited copolymers, could be used in combination with yet another polymeric component to prevent scale formation, and that while Hwa did disclose the specifically-recited organophosphorus acid compound, it provided no suggestion to add a zinc compound to its disclosed combination of SSMA and organophosphorus acid compounds, or to use SSMA in combination with an organophosphorus acid compound in the treatment of a cooling water system, where the characteristics could differ significantly from those in Hwa's boiler water system. The court concluded, "At best, in view of these disclosures, one skilled in the art might find it obvious to try various combinations of these known scale and corrosion prevention agents. However, this is not the standard of 35 U.S.C. §103." More recently, the Court of Appeals for the Federal Circuit has stated: "With hindsight, we could perhaps agree that the Houghton article seems like an obvious place to start to address the need in the power plant industry for an improved carbon-catalyzed deoxygenation process employing hydrazine that can be used commercially in a variety of applications. But, "obvious to try" is not the standard." Ecolochem Inc. v. Southern California Edison, 56 U.S.P.Q. 2d 1065, 1075 (Fed. Cir. 2000). Since nothing in the cited references, viewed in combination, teaches or suggests to one of ordinary skill in the art an ink as recited in claims 1 to 4 and 10 to 25,

Appellants are of the position that these claims are patentable with respect to the teachings of the cited references.

Appellants further point out that nothing in the combination of cited references teaches or suggests to one of ordinary skill in the art the present invention as recited in claim 12, which recites specific numbers of cationic sites on the polyquaternary amine molecule for every one anionic site on the lightfastness-imparting agent molecule, and claim 13, which recites specific molar ratios of dye molecules to lightfastness-imparting agent molecules. Since the references do not teach or suggest the specific combination of polyquaternary amine and anionic lightfastness agent in an ink, these references further do not teach or suggest desirable ratios for these values. Accordingly, Appellants are of the position that these claims are particularly in condition for allowance.

In response to Appellants' position, the Examiner has stated that while there is no disclosure of anionic lightfastness agents in Gundlach et al. and no disclosure of a complex between an anionic dye, an anionic lightfastness agent, and a polyquaternary amine compound in Gundlach et al., Bergthaller et al., or Ma et al., Gundlach et al. discloses that upon mixing the anionic dye and the polyquaternary amine compound a complex is formed, and the combination of either Gundlach et al. and Bergthaller et al. or Gundlach et al. and Ma et al. discloses an anionic dye, polyquaternary amine, and anionic lightfastness agent, and these ingredients would intrinsically form a complex as recited in the present claims. Similarly, the Examiner has stated that while there is no disclosure in either Bergthaller et al. or Ma et al. of a polyquaternary amine compound, these references are used as teaching references, and that it is not necessary for these secondary references to contain all of the features of the presently claimed invention; rather, these references teach a certain concept, namely the use of anionic lightfastness agents in ink jet inks, and that in combination with the primary reference, disclose the presently claimed invention.

Appellants, however, are of the position that one of ordinary skill in the art would not be motivated to combine the teachings of the references as the Examiner has done, for the previously stated reasons.

In response to Appellants' position that there is no motivation to combine the references as the Examiner has done, the Examiner has stated that Gundlach et al. is drawn to an ink jet ink and discloses an ink comprising anionic dye and a polyquaternary amine, that both Bergthaller et al. and Ma et al. are drawn to ink jet inks that comprise dyes and that each provides motivation for using an anionic lightfastness agent, i.e. to produce ink with improved colorfastness (Bergthaller et al.) or to produce ink with improved lightfastness (Ma et al.), that Bergthaller et al. and Ma et al. are drawn to the same field of endeavor as Gundlach et al., that Bergthaller et al. and Ma et al. disclose motivation for using an anionic lightfastness agent, and that there is thus proper motivation to combine these references.

In response to Appellants' position that the Examiner's conclusion of obvious is based on improper hindsight reasoning, the Examiner has stated that "it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper." The Examiner has cited In re McLaughlin, 443 F.2d 1392, 170 U.S.P.Q. 209 (C.C.P.A. 1971) as authority for this position.

Appellants disagree with these positions. None of the cited references suggests or teaches the desirability of combining the elements of the present invention as claimed. Obviousness cannot be established by combining references to arrive at the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. In re Geiger, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987); Carella v. Starlight Archery and Pro Line Co., 804 F.2d 135, 231 U.S.P.Q. 644 (Fed. Cir. 1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. (BNA) 929 (Fed. Cir. 1984). When determining patentability under §103, the Examiner must consider the

invention as a whole, and cannot view each element of the claim separately with respect to the prior art. See, e.g., Jones v. Hardy, __ F.2d __, 220 U.S.P.Q. 1021 (BNA) (Fed. Cir. 1984). When prior art references require selective combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. Uniroyal Inc. v. Rudkin Wiley Corp., __ F. 2d __, 5 U.S.P.Q. 2d 1435 (Fed. Cir. 1988); Interconnect Planning Corp. v. Feil, 774 F. 2d 1132, 227 U.S.P.Q. 543 (Fed. Cir. 1985). It is impermissible to use the claims as a frame and the prior art references as a mosaic to piece together a facsimile of the claimed invention. Uniroyal Inc. v. Rudkin Wiley Corp., __ F. 2d __, 5 U.S.P.Q. 2d 1435 (Fed. Cir. 1988); W. L. Gore and Associates, Inc. v. Garlock, Inc., 721 F. 2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983). As the Court of Appeals for the Federal Circuit stated in In re Kotzab, 55 U.S.P.Q. 2d 1313, 1316-17 (Fed. Cir. 2000):

A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. See Dembicza, 175 F.3d at 999, 50 U.S.P.Q.2D (BNA) at 1617. Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher." *Id.* (quoting W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 U.S.P.Q. (BNA) 303, 313 (Fed. Cir. 1983)).

Most if not all inventions arise from a combination of old elements. See In re Rouffet, 149 F.3d 1350, 1357, 47 U.S.P.Q.2D (BNA) 1453, 1457 (Fed. Cir. 1998). Thus, every element of a claimed invention may often be found in the prior art. See id. However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See id. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. See In re Dance, 160 F.3d 1339, 1343, 48 U.S.P.Q.2D (BNA) 1635, 1637 (Fed. Cir. 1998); In re Gordon, 733 F.2d 900, 902, 221 U.S.P.Q.

(BNA) 1125, 1127 (Fed. Cir. 1984). Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. See *B.F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582, 37 U.S.P.Q.2D (BNA) 1314, 1318 (Fed. Cir. 1996).

The Board, in Ex Parte Levengood, 28 U.S.P.Q. 2d 1300 (Bd. Pat. App.& Int. 1993) reversed the rejection of all claims "because the examiner has used the wrong standard of obviousness.":

"Obviousness is a legal conclusion, the determination of which is a question of patent law. In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963). In order to establish a *prima facie* case of obviousness, it is necessary for the examiner to present evidence¹, preferably in the form of some teaching, suggestion, incentive or inference in the applied prior art, or in the form of generally available knowledge, that one having ordinary skill in the art would have been led to combine the relevant teachings of the applied references in the proposed manner to arrive at the claimed invention. See, for example, Carella v. Starlight Archery, 804 F.2d 135, 231 USPQ 644 (Fed. Cir. 1986); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 227 USPQ 657 (Fed. Cir. 1985).

..."

"...the examiner may provide an explanation based on logic and sound scientific reasoning that will support a holding of obviousness. In re Soli, 317 F.2d 941, 137 USPQ 797 (CCPA 1963)²..."

..."

"In this case, however, the only suggestion for the examiner's combination of the isolated teachings of the applied references improperly stems from appellant's disclosure and not from the applied prior art. In re Ehrreich, 590 F.2d 902, 200 USPQ 504 (CCPA 1979). At best, the examiner's comments regarding obviousness amount to an assertion that one of ordinary skill in the relevant art would have been able to arrive at appellant's invention because he had the necessary skills to carry out the requisite process steps. This is an inappropriate standard for obviousness. See Orthokinetics Inc. v. Safety Travel Chairs Inc., 806 F.2d 1565, 1 USPQ 2d 1081 (Fed. Cir. 1986). That which is within

the capabilities of one skilled in the art is not synonymous with obviousness. Ex Parte Gerlach, 212 USPQ 471 (Bd. App. 1980). ... That one can reconstruct and/or explain the theoretical mechanism of an invention by means of logic and sound scientific reasoning does not afford the basis for an obviousness conclusion unless that logic and reasoning also supplies sufficient impetus to have led one of ordinary skill in the art to combine the teachings of the references to make the claimed invention.

"Our reviewing courts have often advised the Patent and Trademark Office that it can satisfy the burden of establishing a *prima facie* case of obviousness only by showing some objective teaching in either the prior art, or knowledge generally available to one of ordinary skill in the art, that 'would lead' that individual 'to combine the relevant teachings of the references.' In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). In re Newell, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Accordingly, an examiner cannot establish obviousness by locating references which describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done."

1. The importance of evidence in the examination process is set forth in the following quotation from In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984): "The Supreme Court in Graham v. John Deere Co., 383 U.S. 1, 148 U.S.P.Q. 459 (1966), focused on the procedural and evidentiary processes in reaching a conclusion under section 103. As adapted to ex parte procedure, Graham is interpreted as continuing to place the 'burden of proof on the Patent Office which requires it to produce the factual basis for its rejection of an application under sections 102 and 103'. In re Warner, 379 F.2d 1011, 1016, 154 USPQ 173, 177 (CCPA 1967). After a *prima facie* case of obviousness has been established, the burden of going forward shifts to the applicant."
2. Preferably the examiner's explanation should be such that it provides that impetus necessary to cause one skilled in the art to combine the teachings of the references to make the proposed modification. In re Albrecht, 514 F.2d 1385, 185 USPQ 585 (CCPA 1975).

As the Court of Appeals for the Federal Circuit recently stated in Yamanouchi Pharmaceutical Co. v. Danbury Pharmacal Inc., 56 U.S.P.Q. 2d 1641 (Fed. Cir. 2000) at 1644:

This court has recently reemphasized the importance of the motivation to combine:

As this court has stated, "virtually all (inventions) are combinations of old elements." Therefore, an examiner (or accused infringer) may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner (or accused infringer) to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention.

....
...To counter this potential weakness in the obviousness construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

In re Rouffet, 149 F.3d 1350, 1357-58, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998) (internal citations omitted).

For the instant application, the Examiner also appears to have attempted to use the claimed invention as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. This method is clearly impermissible. Nothing in any of the cited references teaches or suggests the combination of elements recited in the instant claims.

In response to Appellants' position that one of ordinary skill in the art would not be led to make an ink wherein both an anionic dye and an anionic lightfastness agent are complexed to a polyquaternary amine, the Examiner has stated that Gundlach discloses that upon mixing the polyquaternary amine and the anionic dye form a complex, and that it is

clear that upon mixing with the anionic lightfastness agent of Bergthaller et al. or Ma et al., a complex would intrinsically form between the three ingredients.

Appellants disagree with this position. The Examiner appears to be relying upon a theory of inherency to establish obviousness. In relying on the theory of inherency to establish obviousness, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. In re King, 801 F.2d 1324, 231 U.S.P.Q. 136 (Fed. Cir. 1986); W. L. Gore and Associates, Inc. v. Garlock, Inc., 721 F. 2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983); In re Oelrich, 666 F.2d 578, 212 U.S.P.Q. 323 (CCPA 1981); Ex Parte Levy, 17 U.S.P.Q. 2d 1461 (BdPatApp & Inter 1990). Again, the Examiner may be suggesting that the present invention may have been obvious to try based upon the teachings of the prior art; obvious to try, however, is not the standard of obviousness under §103.

The Examiner has stated, with respect to Appellants' argument that both the suggestion and the expectation of success must be found in the prior art, and not in Appellants' disclosure, that given that Bergthaller et al. and Ma et al. disclose that the use of anionic lightfastness agents in ink jet inks produce inks with improved colorfastness or lightfastness, it is clear that the prior art sets forth an expectation of success for using the anionic lightfastness agents of Bergthaller et al. or Ma et al. in the inks of Gundlach et al.

Appellants disagree with this position. The instant claims recite a complex of an anionic dye, an anionic lightfastness-imparting agent, and a polyquaternary amine compound. Nothing in any of the cited references sets forth any expectation of success in obtaining a complex of all three of these elements. Again, at most, the Examiner may be suggesting that the present invention may have been obvious to try based upon the teachings of the prior art; obvious to try, however, is not the standard of obviousness under §103. Again, as stated in the instant specification,

it is believed that in the inks according to the present invention, the lightfastness-imparting agent and the anionic dye are both complexed to the polyquaternary amine compound, and are thus in close proximity to each other; accordingly, the lightfastness-imparting agent is always in a location wherein it can function most efficaciously in protecting the chromophore from degradation caused by short wave radiation such as ultraviolet radiation. This protection is particularly important in ink compositions that employ an anionic dye in combination with cationic fixing agents.

and

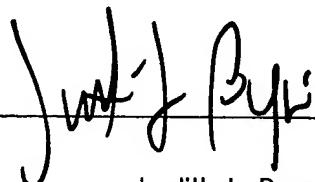
it is believed that incorporation of anionic lightfastness agents in accordance with the teachings of this invention promote the lightfastness of ternary mixtures of an anionic lightfastness-imparting agent and anionic dye in association with a polyquaternary amine compound by separating the dye molecules associated with the anionic polymer with anionic reagents that can actively interact with photoexcited dye molecules to promote non-destructive recombination of photoexcited anionic radicals and intercept destructive free-radical intermediates.

While the Examiner has established that each of the cited references has advantages of its own, the Examiner has failed to establish that one of ordinary skill in the art would be motivated to select these particular references and combine them as suggested by the Examiner to arrive at the instantly claimed invention. Accordingly, Appellants are of the position that the present invention is patentable with respect to the cited references.

VIII. **CONCLUSION:**

For the reasons set forth herein, Appellant is of the position that the claims of the present application are patentable with respect to the prior art cited by the Examiner, and accordingly respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's rejections of the claims.

Respectfully submitted,



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JLB/cw

December 13, 2004

Xerox Corporation

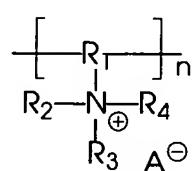
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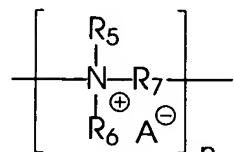
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CLAIMS APPENDIX**CLAIMS INVOLVED IN THE APPEAL:**

1. An ink composition comprising (a) water and (b) a complex of (i) an anionic dye, (ii) an anionic lightfastness-imparting agent which is an ultraviolet absorber, a thiosulfate salt, a trithionate salt, a tetrathionate salt, or a mixture thereof, and (iii) a polyquaternary amine compound.
2. An ink according to claim 1 wherein the polyquaternary amine compound is of the formulae



or



wherein n is an integer representing the number of repeat monomer units, R₁ and R₇ each, independently of the other, is an alkylene group, an arylene group, an arylalkylene group, or an alkylarylene group, and R₂, R₃, R₄, R₅, and R₆ each, independently of the others, are hydrogen atoms, alkyl groups, aryl groups, arylalkyl groups, or alkylaryl groups.

3. An ink according to claim 1 wherein the polyquaternary amine compound is selected from the group consisting of polydiallyl ammonium compounds, polyquaternized polyvinylamines, polyquaternized polyallylamines, epichlorohydrin/amine copolymers, cationic amido amine copolymers, copolymers of vinyl pyrrolidinone and a vinyl imidazolium salt, and mixtures thereof.

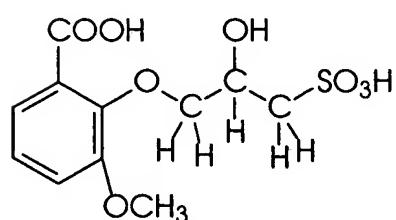
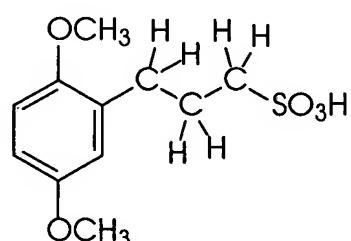
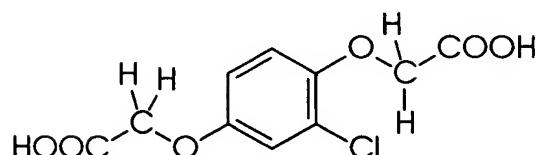
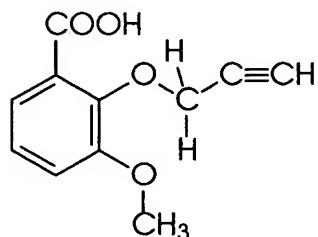
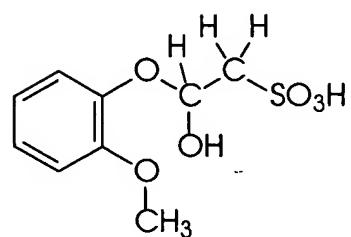
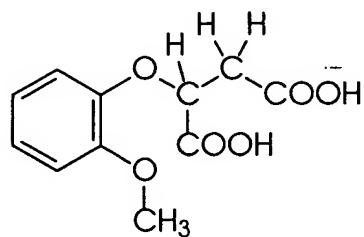
4. An ink according to claim 1 wherein the polyquaternary amine compound is a polydiallyl dimethyl ammonium compound.

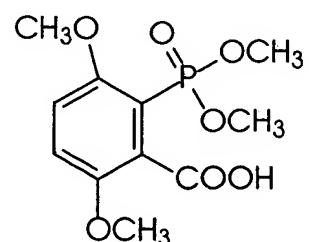
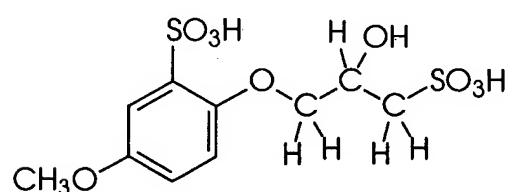
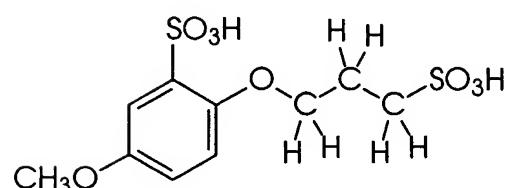
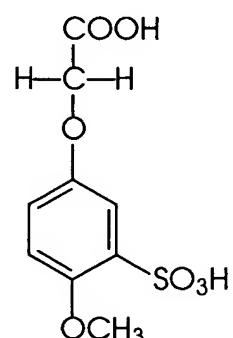
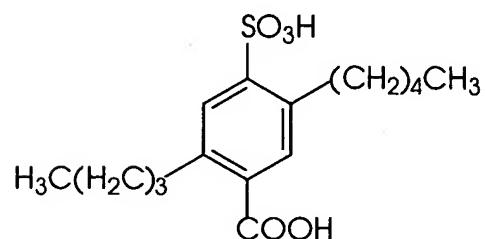
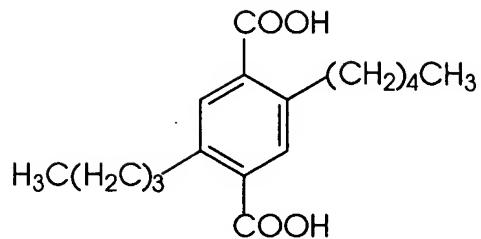
5. An ink according to claim 1 wherein the anionic lightfastness-imparting agent is an ultraviolet absorber.

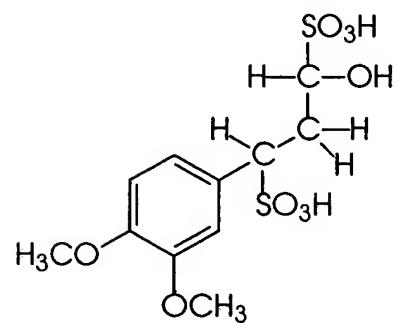
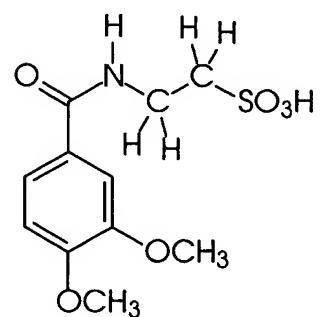
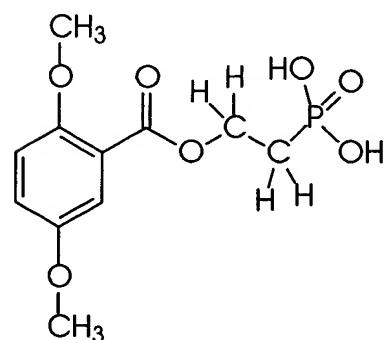
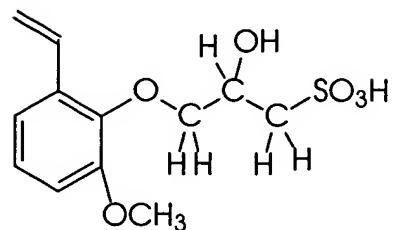
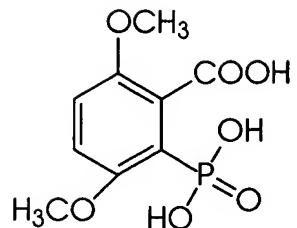
6. An ink according to claim 1 wherein the anionic lightfastness-imparting agent is selected from the group consisting of (hydroxyphenyl)benzotriazoles, hydroxybenzophenones, hydroxybenzoic acids, alkoxybenzoic acids, esters of substituted benzoic acids, (hydroxyphenyl)1,3,5 triazines, and mixtures thereof.

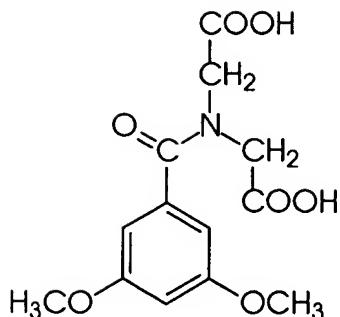
7. An ink according to claim 1 wherein the anionic lightfastness-imparting agent is selected from the group consisting of 2-hydroxy-4-methoxybenzophenone-5-sulfonic acid; 2,2'-dihydroxy-4,4'dimethoxybenzophenone-5-sulfonic acid; 2,3-dimethoxybenzoic acid; 3,4-dimethoxybenzoic acid; 3,5-dimethoxybenzoic acid; 2,5-dimethoxybenzoic acid; 2,6-dimethoxybenzoic acid; 3,4-dimethoxybenzenesulfonic acid; 3,4,5-trimethoxybenzoic acid; 2,4,5-trimethoxybenzoic acid; 4,5-dimethoxyphthalic acid; 2,3-bis-isopropylidenedioxybenzoic acid; 2,3-bis-(carboxymethoxy)-benzoic acid; 2,5-dihydroxyphenylacetic acid; and mixtures thereof.

8. An ink according to claim 1 wherein the anionic lightfastness-imparting agent is selected from the group consisting of









and mixtures thereof.

9. (Cancelled)

10. An ink according to claim 1 wherein the anionic lightfastness-imparting agent is selected from the group consisting of thiosulfate salts, trithionate salts, tetrathionate salts, and mixtures thereof.

11. An ink according to claim 1 wherein the number of cationic sites on the polyquaternary amine molecule for every one anionic site on the dye molecule is at least about 1.5, and wherein the number of cationic sites on the polyquaternary amine molecule for every one anionic site on the dye molecule is no more than about 10.

12. An ink according to claim 1 wherein the number of cationic sites on the polyquaternary amine molecule for every one anionic site on the lightfastness-imparting agent molecule is at least about 1, and wherein the number of cationic sites on the polyquaternary amine molecule for every one anionic site on the lightfastness-imparting agent molecule is no more than about 5.

13. An ink according to claim 1 wherein the molar ratio of dye molecules to lightfastness-imparting agent molecules is at least about 2:1, and wherein the molar ratio of dye molecules to lightfastness-imparting agent molecules is no more than about 20:1.

14. An ink according to claim 1 further containing a nonpolymeric salt.

15. An ink according to claim 14 wherein the nonpolymeric salt is present in the ink in an amount of at least about 0.1 percent by weight of the ink, and wherein the nonpolymeric salt is present in the ink in an amount of no more than about 40 percent by weight of the ink.

16. A process which comprises (a) incorporating into an ink jet printing apparatus an ink composition comprising (a) water and (b) a complex of (i) an anionic dye, (ii) an anionic lightfastness-imparting agent which is an ultraviolet absorber, a thiosulfate salt, a trithionate salt, a tetrathionate salt, or a mixture thereof, and (iii) a polyquaternary amine compound, and (b) causing droplets of the ink composition to be ejected in an imagewise pattern onto a substrate.

17. A process according to claim 16 wherein the printing apparatus employs a thermal ink jet process wherein the ink in the nozzles is selectively heated in an imagewise pattern, thereby causing droplets of the ink to be ejected in imagewise pattern.

18. A process according to claim 16 wherein the printing apparatus employs an acoustic ink jet process wherein droplets of the ink are caused to be ejected in imagewise pattern by acoustic beams.

19. A process according to claim 16 wherein the printing apparatus employs a piezoelectric ink jet process, wherein droplets of the ink are caused to be ejected in imagewise pattern by oscillations of piezoelectric vibrating elements.

20. A process which comprises (a) incorporating into an ink jet printing apparatus an ink composition comprising (a) water and (b) a complex of (i) an anionic dye, (ii) an anionic lightfastness-imparting agent which is an ultraviolet absorber, a thiosulfate salt, a trithionate salt, a tetrathionate salt, or a mixture thereof, and (iii) a polyquaternary amine compound, and (b) causing droplets of the ink composition to be ejected in an imagewise pattern onto a paper substrate.

21. An ink according to claim 1 wherein the anionic lightfastness-imparting agent is a thiosulfate salt.

22. An ink composition according to claim 21 wherein the polyquaternary amine compound is poly(dimethyldiallyl ammonium chloride).

23. An ink composition according to claim 22 wherein the anionic dye is Acid Red 52.

24. An ink composition according to claim 22 wherein the anionic dye is Acid Yellow 23.

25. An ink composition according to claim 22 wherein the anionic dye is Acid Blue 9.

EVIDENCE APPENDIX

A copy of each of the following items of evidence relied on by
the Appellant (and/or the Examiner) is attached:

NONE

RELATED PROCEEDINGS APPENDIX

Copies of relevant decisions in the following related proceedings
are attached:

NONE